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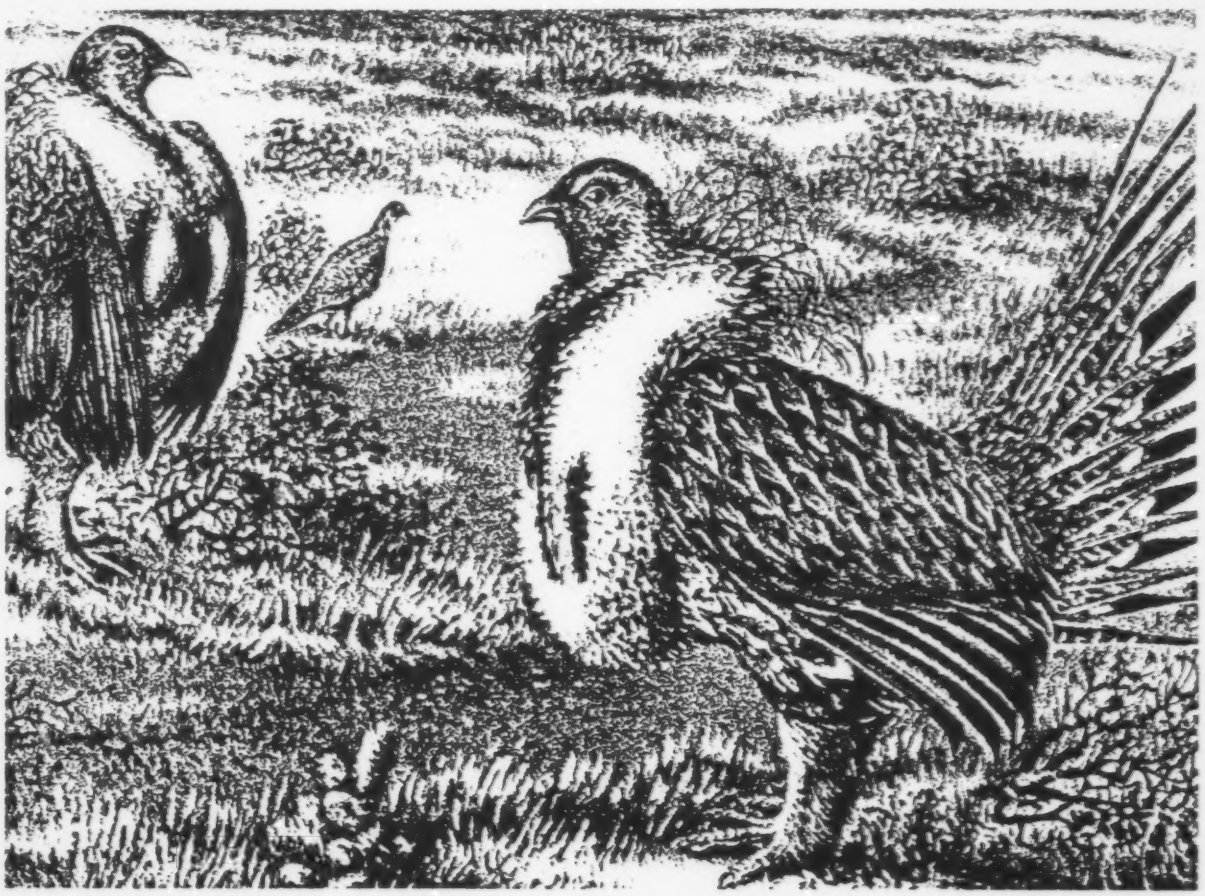
# Recovery and Management Plan for Sage Grouse in Saskatchewan

*Wildlife Technical Report 92-5*



# Recovery and Management Plan for Sage Grouse in Saskatchewan

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# Preface

This recovery plan represents the Wildlife Branch view of actions which will help ensure the Sage Grouse remains a viable component of our fauna. Individual action items identified in the plan will be undertaken in consideration of other priorities and as opportunities and resources allow. The plan is designed to provide direction to all people working on Sage Grouse to ensure maximum benefits are derived from Sage Grouse management efforts.

# Executive Summary

This report presents a plan for the retention of Sage Grouse (*Centrocercus urophasianus*), a special yet scarce feature of the prairie ecosystem of southwestern Saskatchewan.

The document is in two parts. The first briefly examines what is known of the ecology of the species, its past and current continental and provincial distribution and abundance, as well as factors pertinent to restoration potential. Extensive use is made of the literature available from other jurisdictions, a number of which have previously, or still do, allow hunting of Sage Grouse. The Saskatchewan data has been consolidated and is included in map and tabular form. The provincial range is now associated with the major drainages of the Missouri Basin south of the Cypress Hills - Wood Mountain plateaus. Despite observation records from 122 locations, only at 48 locations is it possible to identify known or possible leks of some type, while there are only 14 locations at which primary or secondary leks were confirmed active when last surveyed. Recent (1987, 1988) results suggest that a provincial spring population in the order of approximately 2,000 Sage Grouse is possible, however, the data base is neither long nor complete.

The second part of the document provides a recovery and management plan premised on the conclusion that it is consistent with the mandate of Wildlife Branch, Saskatchewan Natural Resources, and with the goals of the Prairie Conservation Action Plan, that efforts be made to ensure that this threatened species remains an integral part of the sagebrush steppe it inhabits. Various management options and constraints are discussed. The objectives include: a Saskatchewan range contiguous with that in Montana and Alberta; a minimum of 25 active primary and secondary leks; and, as an interim figure pending an improved data base, a minimum spring population averaging at least 2,500 birds. A total of 19 actions are recommended in terms of: population monitoring; species protection; identification, evaluation, protection and enhancement of habitat; interagency co-operation; and, public education and co-operation. Although the question of sport hunting has been examined, the report recommends that Sage Grouse should continue under the status of a threatened non-game species.

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# Section I - Background Information

## 1.0 Species Autecology

## 1.1 Overview

The Sage Grouse (*Centrocercus urophasianus*) is a year-round resident of the western Great Plains and intermontane basins of North America, ranging from New Mexico to Saskatchewan and westward to California and Washington (Figure 1). Over much of its range it is sympatric with its smaller relative, the Sharp-tailed Grouse (*Pedioecetes phasianellus*), however, the darker, gray-buff and black Sage Grouse attains lengths up to 75 cm and weights (males) up to 3 kg. The white, upper breast and neck feathers and inflatable nuchal sacs of the breeding males are a distinctive feature exhibited during courtship displays at communal arenas (leks or strutting grounds). This grouse is aptly named because of its obligate commensal relationship with sagebrush (*Artemisia spp.*) shrubs so essential to its habitat.

Figure 1. Distribution of Sage Grouse in North America (modified after Johnsgard, 1973; and, Donoho and Roberson, 1985)

Sage Grouse often occur in sexually segregated flocks, the main exceptions being mixed-sex flocks of spinster hens and juveniles in summer (Beck, 1975), adult mixed-flocks in severe winter weather (Wallestad, 1975), lone or several juvenile males in fall and early winter, and the solitary laying and early brood rearing period for nesting hens. Winter flocks of 12 to 48 are common (Beck, 1977) but may range up to more than 100 birds; male flocks tend to be smaller.

Although considered to be essentially non-migratory, Sage Grouse undertake some seasonal movements. Movements of up to 80 km from summer to winter habitat are known from Idaho (Connelly, 1982), but distances on the order of 5 to 20 km are more common. During spring and summer the lek is the focal point for Sage Grouse, not only for mating, but also as a hub for nesting and brood rearing activity. Leks vary in size and spacing. Although adult males show strong fidelity to one strutting ground (Dalke et al, 1963), females and yearling males regularly move between adjacent leks (Emmons and Braun, 1984). The diet of the adult Sage Grouse consists primarily of the leaves of herbs and shrubs, as these birds are unable to digest seeds because of the absence of a muscular gizzard (Wallestad, 1975). The evergreen sagebrush is thus a critical winter food source to which access may be limited by snow cover. Suitable ranges are, therefore, areas with a sufficient extent and density of sagebrush tall enough to remain above the snow.

## 1.2 Life History and Habitat

### 1.2.1 Spring and Summer

Activity on the strutting grounds may begin as early as late-February to mid-March depending locally on the date at which ground becomes snow-free. Males begin to display and establish territories on the lek; generally, age-related dominance accounts for a small number of males holding the central territories while yearlings are relegated to peripheral areas. Sage Grouse cocks attend the lek for considerably longer than the hens. For the latter, attendance is confined to about a 30-40 day period, within which the majority of visits occur over about 10-15 days (Jenni and Hartzler, 1978). There may be males on the lek for 60-80 days. The peak of hen attendance occurs in early to mid-April in Montana and Idaho (Dalke *et al*, 1963; Jenni and Hartzler, 1978) and mid to late-April in Saskatchewan and Alberta (Kerwin, 1971). Peak attendance by cocks occurs over the 3-4 weeks after that of the hens, owing to the arrival of yearling males on the lek once the hens have left. The implications of attendance patterns are discussed further in section 6.5.

Strutting displays occur primarily at dawn and dusk, although participation is lower and activity less vigorous at dusk (Patterson, 1952). Activity is concentrated in the 60-90 minute periods centered on sunrise and sunset. Variability may be introduced by such factors as adverse weather, lunar brightness (inducing night displays), and disturbance by predators or human intrusion. Kerwin (1971) reported the presence of males on the lek all night, with sporadic strutting, and of females roosting nearby. Both sexes generally depart during daytime for the immediate surrounding areas. Apart from visitations to other nearby leks, most of the territorial males could be expected to restrict their daily movements to within 1-2 km of the lek (Wallestad and Schladweiler, 1974). Daytime loafing and feeding habitats of adults are generally areas of 20-40% canopy cover of sagebrush.

The leks themselves are usually open areas in or near sagebrush flats in native grassland. Terrain will normally be flat to gently sloping, but may include low knolls and ridges. In Saskatchewan, the majority of leks are associated with creek or valley bottom lands (Kerwin, 1971; Harris and Weidl, 1988). Approximately one-half to one hectare of ground is used for strutting, depending on the number of birds involved. Kerwin (1971) reported the mean maximum number of males as 26-28 in a two-year study of 9 Saskatchewan leks.

Mating occurs on the strutting grounds as hens gather in groups or clusters in the territories of only a few selected cocks (Jenni and Hartzler, 1978). The hens then depart to nearby areas of open sagebrush to nest in the cover of this shrub species. Banasch (1985), reporting on the finding of several studies, indicated that preferred nesting habitat would be areas of 20-40% canopy cover of sagebrush averaging near 40 cm in height. The additional concealment provided by inter-sagebrush cover of grasses, herbs and other shrubs is considered vital to improved nesting success. Most of the nests are constructed in the general vicinity of the lek. Wallestad and Pyrah (1974) reported the mean nest-lek distance for adult hens to be 2.5 km in a study in central Montana. Close to 75% of nests could be expected to occur within a 5 km radius of the nearest lek, and about 95% within 10 km.

A clutch of 4-13 eggs is laid in early May; mean clutch sizes of 7 and 9 are reported for yearling and adult females respectively (Wallestad and Pyrah, 1974). Hatching takes place in the first 2 weeks of June in Saskatchewan (Kerwin, 1971). Cool, wet weather is thought to adversely affect hatching success. It appears that somewhere between 40 and 70% of nests may be successful (Kerwin, 1971; Wallestad, 1975; Johnsgard, 1973), although considerable annual fluctuations may be anticipated. Further loss occurs during the summer as a result of juvenile mortality (due to predation, accidents, disease etc.) that reduces brood size. This decline is on the order of 35-50% in the first 10 weeks of the juveniles' lives. As a result, juvenile-hen ratios on the order of 2.5:1 to 3.5:1 can be expected by late summer (Johnsgard, 1973; Wallestad, 1975).

Important summer foods of juvenile Sage Grouse are succulent forbs and some insects. Peterson (1970) found first-week chicks to have 60% of their diet composed of ants, beetles and grasshoppers. The latter were consumed in proportion to abundance by both juveniles and adults, although for the adults the proportion of insect material is about 5% of the diet. Table 1 lists common plant material consumed.

Table 1. Forbs consumed by juvenile Sage Grouse, according to several investigators: 1) Patterson, 1970, cited in both Wallestad 1975 & Banasch 1985; 2) Kerwin, 1971; 3) Banasch, 1985, also citing Neel, 1980.

| 1 | 2 | 3 | GENUS | COMMON NAME |
|---|---|---|---|---|
| + | + | + | Achillea | yarrow |
| | | + | Agoseris | false dandelion |
| + | | | Antennaria | everlasting |
| | | + | Arabis | rock cress |
| + | + | + | Artemisia (frigida) | pasture sage |
| | | + | Aster | aster |
| | + | | Astragalus | milk-vetch |
| | | + | Crepis | hawksbeard |
| | + | + | Erigeron | fleabane |
| + | | + | Grindelia | gumweed |
| + | + | + | Lactuca | prickly lettuce |
| + | + | + | Lepidium | pepper-grass |
| | | + | Lomatium | prairie parsley |
| + | + | + | Medicago* | alfalfa |
| | + | | Melilotus* | sweet-clover |
| | + | + | Phlox | phlox |
| | + | | Plantago | plantain |
| | | + | Senecio | groundsel |
| | + | | Sonchus | sowthistle |
| + | + | + | Taraxacum* | dandelion |
| + | + | + | Tragopogon* | goat's-beard |
| | | + | Trifolium* | clover |
| + | + | + | [ unident. forbs ] | |

[+ indicates a reference to the plant by the author(s)]
* Introduced species normally found primarily in disturbed sites

Brooding hens generally utilize meadows and areas of light (5-20% canopy cover of sagebrush. In Saskatchewan, Kerwin (1971) determined that broods made use of areas with 6-7% sagebrush crown cover. Clark and Dubé (1984) mapped nesting and brood rearing habitat within 3.2 km radius of 25 leks in Alberta. They found the average composition of these native grassland blocks to be: 22% heavy-medium sagebrush; 47% light sagebrush; 11% sparse sagebrush and 3% wet meadows. Daily movements by hens with broods are limited to a few hundred metres at most. These birds may move into alfalfa stands where they are available and, as curing of upland forbs progresses on more xeric sites, may then increasingly move into more mesic locations. Open water is not essential, but its presence may be associated with greater availability of succulent forbs as the summer progresses (Banasch, 1985). Consumption of sage shrub leaves by juveniles begins after 11 weeks, while the forb pasture sage (*Artemisia frigida*) is eaten during early periods and may be transitional to greater ingestion of sagebrush leaves.

Adult males and broodless hens also spend the summer feeding on succulent forbs, but will make secondary use of sagebrush. Kerwin (1971) reported that adults made use of relatively open areas with about 10% crown cover of sagebrush. The sagebrush leaves are still eaten, but may comprise only 10-40% of the diet volume (Wallestad, 1975; Kerwin, 1971). Use of alfalfa hayfields is frequent (Banasch, 1985), but this is probably a function of availability of this habitat type.

### 1.2.2 Fall and Winter

The onset of fall induces several changes in Sage Grouse behaviour. These include: dissolution of brood structure; grouping into flocks; movement into areas of denser sagebrush; increased feeding on sagebrush leaves; and, an increase in the size of individual home ranges. As indicated previously, there is considerable sexual segregation of the flocks. Adult and yearling males may be found together, as may non-breeding females. Juvenile males may either depart to seek out male flocks or remain with their cohorts in largely female flocks (Beck, 1977). Uncertain success in the former action is thought to contribute to reduced overwinter survival of juvenile males (Wallestad, 1975). This may, in part, account for the declining proportion of males in the population, which falls from 50% in juveniles to roughly 30% among adults (Johnsgard, 1973).

Sagebrush provides the sole food and a source of cover for the wintering Sage Grouse. Winter habitat therefore consists of terrain providing sufficient density of sagebrush that will continue to protrude above the snow. Stands of greater than 20% crown cover are actively selected, while the female flocks are reported to use denser, taller sagebrush stands than male flocks (Beck, 1977). Within suitable habitat, areas of level to gently sloping ground, with south to south-westerly aspects, are commonly frequented. Abnormal snow depths will prompt movement to, and thus concentration in, locations offering taller sagebrush. Home ranges on the order of 1000-3000 ha, with normal daily movements close to 1 km, but up to 4 km, were reported for areas in central Montana (Eng and Schladweiler, 1972).

In addition to providing cover, sagebrush provides a relatively high protein source of winter nutrition, but this varies with the species and subspecies of *Artemisia*. Wyoming big sagebrush (*A. tridentata wyomingensis*) contains as much as 13-16% crude protein (Remington and Braun, 1985) and, where abundant, is considered to provide superior winter habitat in Montana (Watts, pers. comm.). By contrast, areas of the shorter silver sagebrush (*A. cana*) support lower densities of Sage Grouse. Nevertheless, the quality of sagebrush as a food source enables these grouse to have a positive overwinter energy balance. Remington and Braun (1988) reported that all ages and sex classes (of healthy grouse) gain or at least maintain weight during winter. Use of snow burrows provides some assistance in conserving energy during periods of severe cold and sufficient snow (Back *et al*, 1987). Even in periods of moderate snow accumulations, burrowing may be possible in small drifts in the lee of shrubs if there is not heavy ice crust.

## 1.3 Mortality and Survivorship

Despite the fact that healthy Sage Grouse usually gain weight through the winter, most studies have concluded that annual adult mortality (for females) is approximately 60-67% (Wallestad, 1975; Johnsgard, 1973). Most yearling mortality occurs during winter, and mortality rates are higher for yearlings than for adults. When overwinter losses of juveniles are added to those from hatching to fall, an annual mortality rate of 85% was determined. Wallestad (1975) estimated that, from an overall mean clutch size of 8.2 eggs, 100 hens in the central Montana population can produce about 62-63 yearling hens the following spring (i.e. 15% survival of 820 eggs/100 hens, with about half being female). This would constitute a basically stable population if adult hen mortality is indeed between 60-67%.

The situation described above suggests that survivorship among Sage Grouse is quite similar to that of the other two grassland Tetraonids, the Sharp-tailed Grouse (*Pedioecetes phasianellus*) and the Greater Prairie Chicken (*Tympanuchus cupido pinnatus*). Johnsgard (1973) lists annual adult survival of those two related grouse of the Great Plains region as 40% and 28-38% respectively. In this case, few Sage Grouse will attain an age of greater than 3-4 years, although a maximum age of 8 years has been recorded (Eng in Wallestad, 1975). Donoho and Roberson (1985) suggest a cyclic (10-year) population pattern may occur with Sage Grouse.

The principal causes of mortality include disease and parasites, predation, accidents, inclement weather, habitat loss, and, in some jurisdictions, hunting. The latter two factors are discussed further in Section 3. Diseases and parasites have not been investigated in detail for this report, but Kerwin (1971) found the tapeworm (*Raillietina centrocerci*) very common (up to 59% of 83 juveniles examined) in his study. Many species can be counted among predators of Sage Grouse at their nests. Those include coyotes, ground squirrels, badgers, various raptors, gulls, magpies and crows. Other possibilities, not encountered in the literature, may be skunks, bobcats and even snakes and weasels. No single raptor species is indicated as a major predator, although the presence of Golden Eagles and Prairie Falcons was seen to cause the grouse to flush from leks (Harris and Weidl, 1988). In areas of hayfields and roads, mowing and vehicle traffic are known to cause some mortality (Kerwin, 1971).

# 2.0 Historical Perspective

The history of Sage Grouse in western North America is similar to many species of wildlife. Abundant at the time of European exploration, they have declined dramatically since the onset of settlement as a result of habitat destruction and initially-unregulated exploitation. Wallestad (1975) credits the Lewis and Clark Expedition with the first description of Sage Grouse in the Missouri Basin of Montana. No reliable estimates of the protohistoric continental population were found, but the species was apparently "very plentiful". With a distribution essentially the same as that of sagebrush, this bird was once found in 15 western states as well as Saskatchewan, Alberta and British Columbia. Over that geographic area, it is entirely conceivable the Sage Grouse numbered somewhere on the order of 8-10 million (present author's rough estimate based mainly on magnitude of sagebrush range lost or altered).

Settlement brought the agricultural practices usually cited as the chief cause of Sage Grouse decimation. Conversion of native sagebrush-grassland for cultivation and permanent pasture had a rapid impact, but there was also heavy hunting pressure before and after the turn of the century. Limitations on hunting were instituted quite early; in Montana, the breeding season was closed to hunting in 1870. By 1897 the Montana daily bag limit was 20 per day, by 1909 it was 5 per day, and by 1927 the season was closed for one year (Wallestad, 1975). This trend is indicative of what was probably occurring with the continental population. Johnsgard (1973) states that by the late 1930's there was restricted hunting allowed in only 2-3 states.

By the mid to late-1940's, the decline may have reached its maximum. Extirpation had occurred in fringe areas of the range, including British Columbia, New Mexico, Oklahoma and Nebraska, and hunting in Montana was discontinued for 9 years. Kerwin (1971) noted that Sage Grouse have not been hunted in Saskatchewan since the 1930's. Apparently, some stabilization occurred in parts of the range during the 1950's and 1960's and a resumption of some hunting took place in 11 states plus the province of Alberta. Johnsgard (1973) estimated the continental kill (by 1970) had reached about 250,000, or about 17% of a roughly-estimated population on the order of 1.5 million; whether this was spring or fall population was not specified. However, he cautioned that a return to hunting was due to a perception that a managed kill was not a limiting factor, due to the high natural annual mortality of the species.

## 3.0 Current Status

No estimate of the continental population in the late 1980's was obtained. However, available information on hunting (to 1981) provides some indication (Donoho and Roberson, 1985). At the start of the decade, Sage Grouse were still a major game bird species (>5,000 killed per year) in Wyoming, Idaho, Montana, Colorado, Utah, Nevada, and California. Limited hunting in North Dakota, Washington and Alberta accounted for only several hundred more killed in each of these areas. No hunting occurred in Oregon, South Dakota, Saskatchewan or New Mexico. In the latter state, there had been limited success in re-introduction, but the species remained on their endangered list.

### Montana

The population in this state is described in general terms as "stable" (Watts, pers. comm.). This must be viewed in the context of year-to-year population fluctuations. For example, from one central Montana 6400 $km^2$ district containing good habitat, the kill in the last decade has averaged 7000 per year, but ranged between 2,000-18,000. Such oscillation includes the variable of hunter effort as well. The average annual state-wide kill is assumed to be roughly 40,000. An early September to early December season is held, with a 3-5 bird bag limit (and 4 times daily possession) usually in place. In prime habitat areas, a fall population density of 5-6 birds per $km^2$ is estimated.

### Alberta

A small population persists in the southeast corner of the province; its former extent is unknown. The current range covers roughly 3500 $km^2$, in which 31 leks are situated in 18 townships (1800 $km^2$). A 1987 survey of 13 active leks counted approximately 300 males among 400 Sage Grouse. This information was used to roughly estimate the provincial spring population at 1500-2000 (Dubé, pers. comm.), or between 5 and 6.6 times the number of males counted.

Hunting was re-opened in 1967 for the first time since the 1930's. Although information was not obtained for all years since, it appears that the kill peaked in 1973 at about 700 grouse (Donoho and Roberson, 1985). More recently (1983-87), based on the assumption of half the hunters being monitored at check stations, the kill has varied between approximately 40-185 Sage Grouse. The 1988 season was a 6-day opening, starting November 28 and open to every game bird permit holder, with a 2 bird season limit.

### Saskatchewan

The following description of the status of Sage Grouse is based on the author's interpretation of information from various sources, including: Killaby (pers. comm.); Kerwin (1971); Bergstrom (1987); Harris and Weidl (1987, 1988) and Hjertaas (1988). No systematic range-wide survey was carried out prior to 1987; Harris and Weidl undertook that work in spring of 1987 and 1988. Previous information

consisted mainly of an array of spot surveys and incidental sighting records which were consolidated by Bergstrom (1987). For the present report, these various sources have now been synthesized in an effort to provide a single listing. A classification (Figure 2) of the observations was employed, based, in part, on the lek terminology used by the Western States Sage Grouse Committee (Autenreith *et al*, 1982). The classification considers both years of record and the number of males observed in determining whether the records indicate a primary lek, secondary lek, satellite (or auxiliary) lek, or simply a casual observation. In addition to summarizing the data on census or survey counts, Table 2 provides an indication of land status at and near leks; this is discussed further in section 6.2. The distribution of the leks and casual observations listed in Table 2 is shown in Figures 3a and 3b. (The tabulation and mapping of these records is intended for update in future as new survey information becomes available.)

In the past, Sage Grouse may have been found as far north as the South Saskatchewan River. However, it was not possible to confirm this. The current range of Sage Grouse in Saskatchewan is essentially restricted to that zone lying south of the Cypress Hills-Wood Mountain uplands. This area is part of the Missouri River drainage basin that dominates the Sage Grouse range of central Montana. With the exception of two records, all sightings and leks are within 60 km of the U.S. border; the east-west extent of the range is about 250 km. Although the gross area of this range is 15,000 km$^2$, the distribution of leks and casual observations is clumped (Figure 3) because most leks are associated with the valley bottoms of the Frenchman River and various creeks (Harris and Weidl, 1988). There are only 43 townships in which records occur, for an area of approximately 4300 km$^2$ or almost two and one-half times larger than indicated above for Alberta. Figure 3 shows that certain localities exhibit lek complexes or areas where several strutting grounds may serve a local population.

**Figure 2. Classification of lek types by observed male Sage Grouse attendance and length of record.**

| Years of Record | Mean # of Males 1-4 | 5-9 | ≥ 10 |
|---|---|---|---|
| 1 | C | L1 | L2 |
| 2 | L1 (C) | L2 (L1) | L3 (L2) |
| 3-5 | L2 (L1) | L3 (L2) | L4 (L3) |

(Lesser Type applies if latest count was 0 males)

Definition:

| | |
|---|---|
| L4 - Primary lek: | a principal Saskatchewan strutting ground, which should be active annually and provide a focus for a wider area. |
| L3 - Secondary lek: | a lek receiving less use than a primary lek, possibly due to a smaller local population, which may not be used during low points in a population cycle. Further data may show this to be a primary lek. |
| L2 - Satellite lek: | a site used temporarily or intermittently as a lek, most likely during periods when the provincial population is higher. Further data may show this to be a secondary lek. |
| L1 - Possible Satellite lek: | a longer period of record is needed to determine whether the site serves as a satellite lek. |
| C - Casual observation: | a chance sighting of a single bird or small group, which may or may not be associated with a nearby lek. |

It is evident from Table 2 that the overall data set is recent and precludes identification of population trends. Years of record exceed 5 years at only 3 locations, but at two of these the last year active was 1983. This also presents difficulties in assessing how many leks can be considered to exist in the province. Of 122 locations, only at 48 (39%) is it presently possible to classify observations as a known or possible primary, secondary or satellite lek using criteria indicated in Figure 2. There are 17 sites at which known primary or secondary leks are identified; 3 of those were inactive when last surveyed. For the 14 which are classed as active, a mean of 21.7 males (s.d. 11.0) per lek have been counted. This is below the mean maximum number of males, at 26.6 (1970) and 28.4 (1971), reported by Kerwin (1971) for 9 leks in the Frenchman River valley. However, Kerwin found the number of males reached peaks later in spring than the timing of the recent surveys (refer to section 6.5). Survey counts since 1968 of 29 leks in Alberta showed a mean number of males of 21.6 (s.d. 17.8) (Dubé, pers. comm.).

Estimation of the provincial population from the available data is difficult and calls for significant assumptions due to: the inherent limitations of spring lek censusing; the length of the Saskatchewan period of record; natural (and possibly cyclic) variability in species numbers, particularly given the annual mortality rates; and, the fact that an opportunity to conduct more intensive searches might still reveal other leks. Harris and Weidl (1988) arrived at an estimated range of 1600-2500 Sage Grouse as a 1988 spring population based on a total male count of 444. Factors allowed for in their computation included: a 50% allowance for males missed because they were not on the lek at the time of survey; an allowance of 15-33% for the existence of unsurveyed leks; and, a 45:55 male:female ratio. They considered 2000 to be a reasonable median value, or about 4.5 times the number of males counted.

In the opinion of the author of the present report, the 2000 figure for a spring population is a plausible, conservative minimum value. However, the available data necessitates the recognition that considerable uncertainty remains (refer to section 6.5). The actual value could be perhaps 30-50% greater. Of course, the fall populations would be the highest. In Montana, where the spring census counts are used as part of overall Sage Grouse management as a game species, the number of males on leks is multiplied by 7 to estimate expected fall population, based on the assumptions of 2 females per male and 2.5 juveniles per female (Watts, pers. comm.). Application to the Harris and Weidl (1988) male count of a multiplier of 7 would yield a Saskatchewan fall population estimate of slightly over 3100 Sage Grouse, whereas application of 2.5 juveniles per female to their 2000-bird spring population would suggest a fall value closer to 5000.

Virtually nothing is known for certain about the wintering of Sage Grouse in this province. Kerwin (1971) had raised the possibility that the birds may move southward into Montana because "there are few resident birds in the Frenchman River Valley" during winter. This has not yet been verified by searches of potential wintering habitat or any banding or telemetry studies (Killaby, pers. comm.). The seasonal migrations in Idaho, involving distances of up to 80 km, are well known (Dalke, *et al*, 1963; Connelly, *et al*, 1988). Berry and Eng (1985) noted seasonal movements in Wyoming of 27-35 km, that were not instigated by severe weather, and which also revealed a certain fidelity to both summer and wintering habitats. The Saskatchewan-Montana border is within reach of movements of the latter magnitude (up to 35 km) for 13 of the 17 aforementioned primary and secondary leks (Figures 3a and 3b), although no specific possible wintering locations in Montana can be identified at this time. However, at least one rancher, with large land holdings in the Frenchman River Valley west of Val Marie, reports that the Sage Grouse on his ranch move only short distances (several kilometers) to wintering sites in the same valley (White, pers. comm.). This would suggest a situation similar to east central Montana where, due to adequate interspersion of summer and winter habitats, less seasonal movement is required (Wallestad, 1975). In any case, Sage Grouse using leks within 5-10 km of the border could already be considered essentially bi-national even in terms of summer habitat use.

Table 2. Summary of Sage Grouse observations in Saskatchewan as of June, 1988. See following three pages. (Refer to text for sources.)

TABLE KEY

| | |
|---|---|
| **Location** | legal land location |
| **Designation** | Map = 1:250,000 NTS map sheet<br>Site = designation used in survey reports by Harris and Weidl (1987/1988) |
| **Obs Type** | classification of observation as shown in Figure 2 |
| **Next Lek** | distance from a lek to nearest other lek |
| **Years of Record** | number of years of any record; year of last survey; last year grouse seen |
| **Count Summary** | highest number of grouse; lowest number of males; mean number of males observed |
| **Land Protection** | Land Tenure:<br>C = Crown; P - private<br>(C* = within area proposed for inclusion in Grassland National Park)<br>Type Crown: CP = community pasture; PL = privately leased<br>% Adj Crown = proportion of land within 1.5 km (1 mile) radius (of this quarter section) that is Crown land<br>CWHPA Status: + = location protected by Saskatchewan Critical Wildlife Habitat Protection Act |

**Table 2. Summary of Sage Grouse observations in Saskatchewan as of June, 1988 (cont'd.) (Refer to text for sources. )**

| LOCATION | | | | | DESIGNATION | | OB | NEXT LEK | YEARS OF RECORD | | | COUNT SUMMARY | | | LAND PROTECTION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| QTR | SEC | TWP | RNG | MER | MAP | SITE | TYPE | (KM) | NO. YEARS | LAST SURVEY | LAST ACTIVE | MAX# BIRDS | MIN# MALES | MEAN# MALES | LAND TENURE | TYPE CROWN | %ADJ CROWN | CWHPA STATUS |
| NW | 1 | 2 | 3 | W3 | 72G | CC | C | | 1 | 1988 | 1988 | 3 | 0 | 0 | | | | |
| NW | 6 | 1 | 5 | W3 | 72G | | C | | 1 | 1988 | 1988 | 3 | 3 | 3 | | | | |
| SE | 6 | 1 | 5 | W3 | 72G | K | L2 | 2 | 1 | 1987 | 1987 | 12 | 10 | 10 | C* | PL | 58 | - |
| NE | 10 | 1 | 5 | W3 | 72G | J | L1 | 4 | 1 | 1987 | 1987 | 9 | 7 | 7 | C* | PL | 100 | - |
| SE | 10 | 1 | 5 | W3 | 72G | SS | C | | 1 | 1988 | 1988 | 4 | 3 | 3 | | | | |
| | 18 | 1 | 5 | W3 | 72G | 61 | C | | 2 | 1987 | 1975 | 2 | 0 | 0 | | | | |
| SW | 2 | 2 | 5 | W3 | 72G | 1 | C | | 1 | 1987 | 1987 | 5 | 4 | 4 | | | | |
| NE | 2 | 1 | 6 | W3 | 72G | | C | | 1 | 1988 | 1988 | 2 | 2 | 2 | | | | |
| N | 4 | 1 | 6 | W3 | 72G | 51 | C | | 1 | 1987 | 1987 | 3 | 3 | 3 | | | | |
| SW | 9 | 1 | 6 | W3 | 72G | 13 | L3 | 4 | 3 | 1988 | 1988 | 58 | 33 | 37 | C* | PL | 100 | - |
| SW | 10 | 1 | 6 | W3 | 72G | | C | | 1 | 1988 | 1988 | 4 | 4 | 4 | | | | |
| SE | 11 | 1 | 6 | W3 | 72G | 12 | L2 | 1 | 3 | 1988 | 1988 | 12 | 0 | 6 | | | | |
| W | 12 | 1 | 6 | W3 | 72G | 11 | L4 | 4 | 3 | 1988 | 1988 | 89 | 38 | 42 | C* | PL | 100 | - |
| NE | 18 | 1 | 6 | W3 | 72G | | C | 1 | 1 | 1988 | 1988 | 2 | 2 | 2 | | | | |
| NW | 29 | 1 | 6 | W3 | 72G | | C | | 1 | 1988 | 1963 | 9 | 1 | 1 | | | | |
| NE | 31 | 1 | 6 | W3 | 72G | | C | 1 | 1 | 1988 | 1988 | 2 | 2 | 2 | | | | |
| NE | 4 | 2 | 6 | W3 | 72G | | L2 | 2 | 1 | 1988 | 1988 | 17 | 10 | 10 | C* | PL | 83 | - |
| E | 5 | 2 | 6 | W3 | 72G | G | L2 | 8 | 1 | 1987 | 1987 | 24 | 18 | 18 | C* | PL | 92 | - |
| NW | 1 | 1 | 7 | W3 | 72G | H | L2 | 4 | 1 | 1987 | 1987 | 13 | 11 | 11 | C* | PL | 79 | - |
| SE | 1 | 1 | 7 | W3 | 72G | | C | | 1 | 1988 | 1988 | 5 | 1 | 1 | | | | |
| NE | 12 | 1 | 7 | W3 | 72G | | L2 | 2 | 1 | 1988 | 1988 | 40 | 26 | 26 | C* | PL | 100 | - |
| NW | 3 | 8 | 7 | W3 | 72G | 29 | C | | 2 | 1987 | 1975 | 2 | 0 | 0 | | | | |
| NE | 4 | 8 | 7 | W3 | 72G | 15 | L1 | 58 | 2 | 1987 | 1987 | 6 | 0 | 3 | C | CP | 100 | + |
| SW | 14 | 1 | 8 | W3 | 72G | | L2 | 1 | 1 | 1988 | 1988 | 57 | 50 | 50 | C | CP | 96 | - |
| NW | 15 | 1 | 8 | W3 | 72G | | L1 | 1 | 1 | 1988 | 1988 | 10 | 7 | 7 | C | PL | 92 | - |
| NE | 1 | 2 | 8 | W3 | 72G | | L2 | 8 | 1 | 1988 | 1988 | 28 | 27 | 27 | C | PL | 96 | - |
| SE | 5 | 1 | 10 | W3 | 72G | E | L2 | 7 | 1 | 1987 | 1987 | 16 | 11 | 11 | C* | PL | 100 | - |
| NW | 6 | 3 | 10 | W3 | 72G | 7 | L3 | 3 | 3 | 1987 | 1987 | 29 | 0 | 19 | C | CP | 100 | + |
| SW | 29 | 3 | 10 | W3 | 72G | 8 | C | | 2 | 1987 | 1983 | 6 | 0 | 0 | | | | |
| NW | 25 | 1 | 11 | W3 | 72G | 6 | L4? | 3 | 6 | 1987 | 1983 | 36 | 9 | 19 | C* | PL | 100 | - |
| NW | 27 | 1 | 11 | W3 | 72G | F | C | | 1 | 1987 | 1987 | 3 | 3 | 3 | | | | |
| SW | 2 | 2 | 11 | W3 | 72G | N | C | | 1 | 1987 | 1987 | 1 | 0 | 0 | | | | |
| NE | 3 | 2 | 11 | W3 | 72G | D | C | | 1 | 1987 | 1987 | 1 | 1 | 1 | | | | |
| SE | 10 | 2 | 11 | W3 | 72G | 49 | I4 | 0 | 3 | 1987 | 1987 | 28 | 10 | 14 | C* | PL | 88 | - |
| NE | 10 | 2 | 11 | W3 | 72G | 5 | L3? | 0 | 6 | 1987 | 1983 | 32 | 0 | 14 | C* | PL | 96 | - |
| NE | 11 | 2 | 11 | W3 | 72G | 9 | C | | 2 | 1987 | 1983 | 2 | 0 | 0 | | | | |
| SW | 13 | 2 | 12 | W3 | 72G | 19 | L3? | 1 | 4 | 1987 | 1974 | 33 | 0 | 18 | C* | PL | 100 | - |
| SE | 24 | 2 | 12 | W3 | 72G | L | C | | 1 | 1987 | 1987 | 1 | 0 | 0 | | | | |
| SW | 24 | 2 | 12 | W3 | 72G | 4 | L1 | 1 | 3 | 1987 | 1987 | 26 | 1 | 1 | C* | PL | 100 | - |
| NE | 26 | 2 | 12 | W3 | 72G | RR | C | | 1 | 1988 | 1988 | 14 | 0 | 0 | | | | |

Table 2. Summary of Sage Grouse observations in Saskatchewan as of June, 1988 (cont'd.) (Refer to text for sources. )

| LOCATION | | | | | DESIGNATION | | OB | NEXT LEK | YEARS OF RECORD | | | COUNT SUMMARY | | | LAND PROTECTION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| QTR | SEC | TWP | RNG | MER | MAP | SITE | TYPE | (KM) | NO. YEARS | LAST SURVEY | LAST ACTIVE | MAX# BIRDS | MIN# MALES | MEAN# MALES | LAND TENURE | TYPE CROWN | %ADJ CROWN | CWHPA STATUS |
| NE | 33 | 2 | 12 | W3 | 72G | PP | C | | 1 | 1988 | 1988 | 2 | 2 | 2 | | | | |
| NE | 34 | 2 | 12 | W3 | 72G | 3 | L3 | 0 | 3 | 1987 | 1987 | 63 | 0 | 17 | C* | PL | 63 | - |
| E | 34 | 2 | 12 | W3 | 72G | 37 | L1? | 0 | 2 | 1987 | 1983 | 14 | 0 | 7 | C* | PL | 50 | - |
| NW | 35 | 2 | 12 | W3 | 72G | M | L1 | 0 | 1 | 1987 | 1987 | 9 | 7 | 7 | C* | PL | 57 | - |
| NW | 36 | 2 | 12 | W3 | 72G | 10 | L3 | 1 | 2 | 1987 | 1987 | 28 | 23 | 12 | C* | PL | 88 | - |
| SE | 3 | 3 | 12 | W3 | 72G | QQ | C | | 1 | 1988 | 1988 | 2 | 2 | 2 | | | | |
| SW | 4 | 3 | 12 | W3 | 72G | 20 | L3 | 1 | 2 | 1987 | 1987 | 20 | 4 | 14 | C* | PL | 79 | - |
| NW | 5 | 3 | 12 | W3 | 72G | 2 | L2 | 1 | 3 | 1987 | 1987 | 20 | 0 | 6 | C* | PL | 88 | - |
| NE | 5 | 3 | 12 | W3 | 72G | O | C | | 1 | 1987 | 1987 | 4 | 1 | 1 | | | | |
| NE | 11 | 3 | 12 | W3 | 72G | 17 | L2 | 0 | 1 | 1987 | 1987 | 13 | 11 | 11 | C* | PL | 100 | - |
| NW | 12 | 3 | 12 | W3 | 72G | 16 | L2 | 0 | 1 | 1987 | 1987 | 12 | 11 | 11 | C* | PL | 100 | - |
| SW | 16 | 3 | 12 | W3 | 72G | OO | C | | 1 | 1988 | 1988 | 3 | 3 | 3 | | | | |
| SW | 28 | 1 | 13 | W3 | 72G | MM | C | | 1 | 1988 | 1988 | 1 | 0 | 0 | | | | |
| NE | 24 | 2 | 13 | W3 | 72G | 1 | C | | 3 | 1987 | 1983 | 9 | 0 | 0 | | | | |
| N | 35 | 2 | 13 | W3 | 72G | 36 | C | | 2 | 1987 | 1983 | 2 | 0 | 0 | | | | |
| W | 29 | 4 | 13 | W3 | 72G | 24 | C | | 2 | 1987 | 1975 | 6 | 0 | 0 | | | | |
| | 27 | 1 | 14 | W3 | 72G | 27 | C | | 2 | 1987 | 1975 | 2 | 0 | 0 | | | | |
| NW | 33 | 2 | 14 | W3 | 72G | 21 | L2? | 14 | 2 | 1987 | 1972 | 28 | 18 | 18 | P | | | - |
| NE | 4 | 5 | 14 | W3 | 72G | NN | C | | 1 | 1988 | 1988 | 1 | 0 | 0 | | | | |
| | 13 | 5 | 14 | W3 | 72G | 26 | C | | 2 | 1987 | 1975 | 3 | 0 | 0 | | | | |
| NE | 20 | 5 | 14 | W3 | 72G | C | L2 | 1 | 2 | 1988 | 1988 | 7 | 5 | 6 | C | CP | 100 | - |
| NE | 22 | 5 | 14 | W3 | 72G | 14 | C | | 2 | 1987 | 1979 | 6 | 0 | 0 | | | | |
| W | 22 | 5 | 14 | W3 | 72G | 22 | L4 | 1 | 3 | 1988 | 1988 | 58 | 23 | 39 | C | CP | 100 | - |
| | 32 | 5 | 14 | W3 | 72G | 25 | C | | 2 | 1987 | 1975 | 5 | 0 | 0 | | | | |
| NW | 2 | 5 | 15 | W3 | 72G | A | C | | 1 | 1987 | 1987 | 1 | 0 | 0 | | | | |
| NW | 10 | 5 | 15 | W3 | 72G | 23 | L2? | 5 | 3 | 1988 | 1987 | 20 | 0 | 6 | C | CP | 100 | - |
| NE | 18 | 5 | 15 | W3 | 72F | P | L3 | 3 | 2 | 1988 | 1988 | 44 | 1 | 23 | C | CP | 79 | - |
| NW | 21 | 5 | 15 | W3 | 72F | B | C | | 1 | 1987 | 1987 | 3 | 1 | 1 | | | | |
| | 24 | 5 | 15 | W3 | 72F | 52 | C | | 2 | 1987 | 1975 | 1 | 0 | 0 | | | | |
| SE | 30 | 5 | 15 | W3 | 72F | KK | C | | 1 | 1988 | 1988 | 3 | 1 | 1 | | | | |
| SW | 23 | 5 | 16 | W3 | 72F | W | C | | 1 | 1988 | 1988 | 4 | 4 | 4 | | | | |
| | 24 | 5 | 16 | W3 | 72F | 29 | C | | 2 | 1987 | 1975 | 1 | 0 | 0 | | | | |
| SW | 26 | 5 | 16 | W3 | 72F | 1 | L4 | 3 | 3 | 1988 | 1988 | 44 | 27 | 29 | C | CP | 100 | - |
| NE | 4 | 5 | 17 | W3 | 72F | JJ | C | | 1 | 1988 | 1988 | 2 | 2 | 2 | | | | |
| NE | 28 | 5 | 17 | W3 | 72F | 2 | L2 | 11 | 3 | 1988 | 1988 | 26 | 0 | 9 | C | PL | 88 | + |
| SE | 11 | 5 | 18 | W3 | 72F | 11 | C | | 1 | 1988 | 1988 | 1 | 0 | 0 | | | | |
| NE | 3 | 5 | 19 | W3 | 72F | U | L1 | 4 | 1 | 1988 | 1988 | 6 | 5 | 5 | C | PL | 46 | + |
| NW | 17 | 5 | 19 | W3 | 72F | R | L2 | 4 | 1 | 1988 | 1988 | 19 | 16 | 16 | C | PL | 54 | - |
| SE | 24 | 5 | 20 | W3 | 72F | LL | C | | 1 | 1988 | 1988 | 2 | 1 | 1 | | | | |
| | 25 | 5 | 20 | W3 | 72F | 30 | C | | 2 | 1988 | 1988 | 5 | 0 | 3 | | | | |

Table 2. Summary of Sage Grouse observations in Saskatchewan as of June, 1988 (cont'd.) (Refer to text for sources. )

| LOCATION | | | | | DESIGNATION | | OB | NEXT LEK | YEARS OF RECORD | | | COUNT SUMMARY | | | LAND PROTECTION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| QTR | SEC | TWP | RNG | MER | MAP | SITE | TYPE | (KM) | NO. YEARS | LAST SURVEY | LAST ACTIVE | MAX# BIRDS | MIN# MALES | MEAN# MALES | LAND TENURE | TYPE CROWN | %ADJ CROWN | CWHPA STATUS |
| NE | 10 | 3 | 23 | W3 | 72F | 4 | L3 | 16 | 3 | 1988 | 19[illegible] | 13 | 9 | 9 | | | | |
| SE | 2 | 1 | 24 | W3 | 72F | K | L2 | 17 | 2 | 1988 | 1988 | 67 | 0 | 24 | C | PL | 79 | + |
| | 13 | 1 | 24 | W3 | 72F | 26 | C | | 2 | 1987 | 1975 | 1 | 0 | 0 | C | CP | 58 | - |
| NE | 26 | 1 | 24 | W3 | 72F | 35 | C | | 2 | 1987 | 1987 | 6 | 0 | 0 | | | | |
| NE | 26 | 1 | 24 | W3 | 72F | 24 | C | | 2 | 1987 | 1987 | 2 | 0 | 0 | | | | |
| NW | 30 | 1 | 24 | W3 | 72F | 25 | C | | 2 | 1987 | 1975 | 12 | 0 | 0 | | | | |
| | 19 | 2 | 24 | W3 | 72F | 5 | C | | 2 | 1987 | 1987 | 1 | 0 | 0 | | | | |
| SE | 1 | 2 | 25 | W3 | 72F | HH | C | 13 | 1 | 1988 | 1988 | 2 | 1 | 1 | | | | |
| N | 23 | 2 | 25 | W3 | 72F | 6 | L1? | 16 | 2 | 1987 | 1982 | 16 | 0 | 8 | P | | | - |
| NW | 24 | 2 | 25 | W3 | 72F | J | C | | 1 | 1987 | 1987 | 4 | 1 | 1 | | | | |
| SW | 14 | 6 | 25 | W3 | 72F | T | L2 | 21 | 1 | 1988 | 1988 | 12 | 12 | 12 | C | PL | 88 | + |
| SE | 4 | 1 | 26 | W3 | 72F | L | L1 | 15 | 2 | 1988 | 1988 | 8 | 6 | 3 | C | CP | 58 | - |
| NW | 17 | 2 | 26 | W3 | 72F | 27 | C | | 2 | 1987 | 1975 | 9 | 0 | 0 | | | | |
| NE | 27 | 1 | 27 | W3 | 72F | I | C | | 1 | 1987 | 1987 | 3 | 0 | 0 | | | | |
| SW | 5 | 2 | 27 | W3 | 72F | F | L1 | 10 | 1 | 1987 | 1987 | 6 | 6 | 6 | C | CP | 100 | - |
| NE | 19 | 2 | 27 | W3 | 72F | G | C | | 1 | 1987 | 1987 | 2 | 2 | 2 | | | | |
| SE | 9 | 6 | 27 | W3 | 72F | H | L2 | 21 | 2 | 1988 | 1988 | 12 | 6 | 6 | C | PL | 42 | + |
| SE | 5 | 1 | 28 | W3 | 72F | N | L1 | 2 | 2 | 1988 | 1988 | 2 | 1 | 1 | C | CP | 58 | - |
| NE | 8 | 1 | 28 | W3 | 72F | V | L1 | 2 | 1 | 1988 | 1988 | 6 | 5 | 5 | C | CP | 100 | - |
| NW | 17 | 1 | 28 | W3 | 72F | O | C | | 1 | 1987 | 1987 | 4 | 3 | 3 | | | | |
| NW | 18 | 1 | 28 | W3 | 72F | 20 | C | | 2 | 1987 | 1975 | 3 | 0 | 0 | | | | |
| | 24 | 1 | 28 | W3 | 72F | 28 | C | | 2 | 1987 | 1975 | 1 | 0 | 0 | | | | |
| NE | 24 | 2 | 28 | W3 | 72F | M | C | | 1 | 1987 | 1987 | 7 | 0 | 0 | | | | |
| SW | 1 | 3 | 28 | W3 | 72F | 23 | C | | 2 | 1987 | 1975 | 2 | 0 | 0 | | | | |
| SE | 5 | 3 | 28 | W3 | 72F | B | C | | 1 | 1987 | 1987 | 4 | 0 | 0 | | | | |
| S | 30 | 3 | 28 | W3 | 72F | 22 | C | | 2 | 1987 | 1975 | 1 | 0 | 0 | | | | |
| SE | 19 | 1 | 29 | W3 | 72F | D | L3 | 1 | 2 | 1988 | 1988 | 34 | 13 | 18 | C | CP | 100 | - |
| SE | 19 | 1 | 29 | W3 | 72F | DD | C | | 1 | 1988 | 1988 | 3 | 1 | 1 | | | | |
| SE | 20 | 1 | 29 | W3 | 72F | Q | L2 | 1 | 1 | 1988 | 1988 | 14 | 13 | 13 | C | CP | 100 | - |
| SW | 28 | 1 | 29 | W3 | 72F | 17 | C | | 2 | 1987 | 1979 | 3 | 0 | 0 | | | | |
| NW | 33 | 1 | 29 | W3 | 72F | EE | C | | 1 | 1988 | 1988 | 2 | 2 | 2 | | | | |
| NW | 33 | 1 | 29 | W3 | 72F | GG | C | | 1 | 1988 | 1988 | 2 | 1 | 1 | | | | |
| NW | 36 | 1 | 29 | W3 | 72F | 19 | C | | 2 | 1987 | 1975 | 6 | 0 | 0 | | | | |
| NW | 3 | 2 | 29 | W3 | 72F | 21 | C | | 1 | 1987 | 1987 | 1 | 0 | 0 | | | | |
| NE | 15 | 3 | 29 | W3 | 72F | FF | C | | 1 | 1988 | 1988 | 6 | 1 | 1 | | | | |
| NE | 34 | 3 | 29 | W3 | 72F | 13 | L4 | 18 | 11 | 1988 | 19[illegible] | 66 | 13 | 23 | C | PL | 79 | + |
| NW | 34 | 3 | 29 | W3 | 72F | BB | C | | 1 | 1988 | 19[illegible] | 7 | 3 | 3 | | | | |
| SW | 10 | 5 | 29 | W3 | 72F | C | C | | 1 | 1987 | 1987 | 2 | 2 | 2 | | | | |
| NW | 15 | 5 | 29 | W3 | 72F | A | C | | 1 | 1987 | 1987 | 2 | 2 | 2 | | | | |
| NW | 4 | 1 | 30 | W3 | 72F | AA | C | | 1 | 1988 | 1988 | 1 | 1 | 1 | | | | |
| SW | 11 | 1 | 30 | W3 | 72F | E | C | | 2 | 1988 | 1988 | 8 | 0 | 4 | | | | |
| NW | 1 | 2 | 30 | W3 | 72F | 18 | L3 | 5 | 3 | 1988 | 1988 | 14 | 5 | 9 | C | PL | 100 | - |

Figure 3a. Sage grouse leks and sightings in southwest Saskatchewan as of June, 1988.

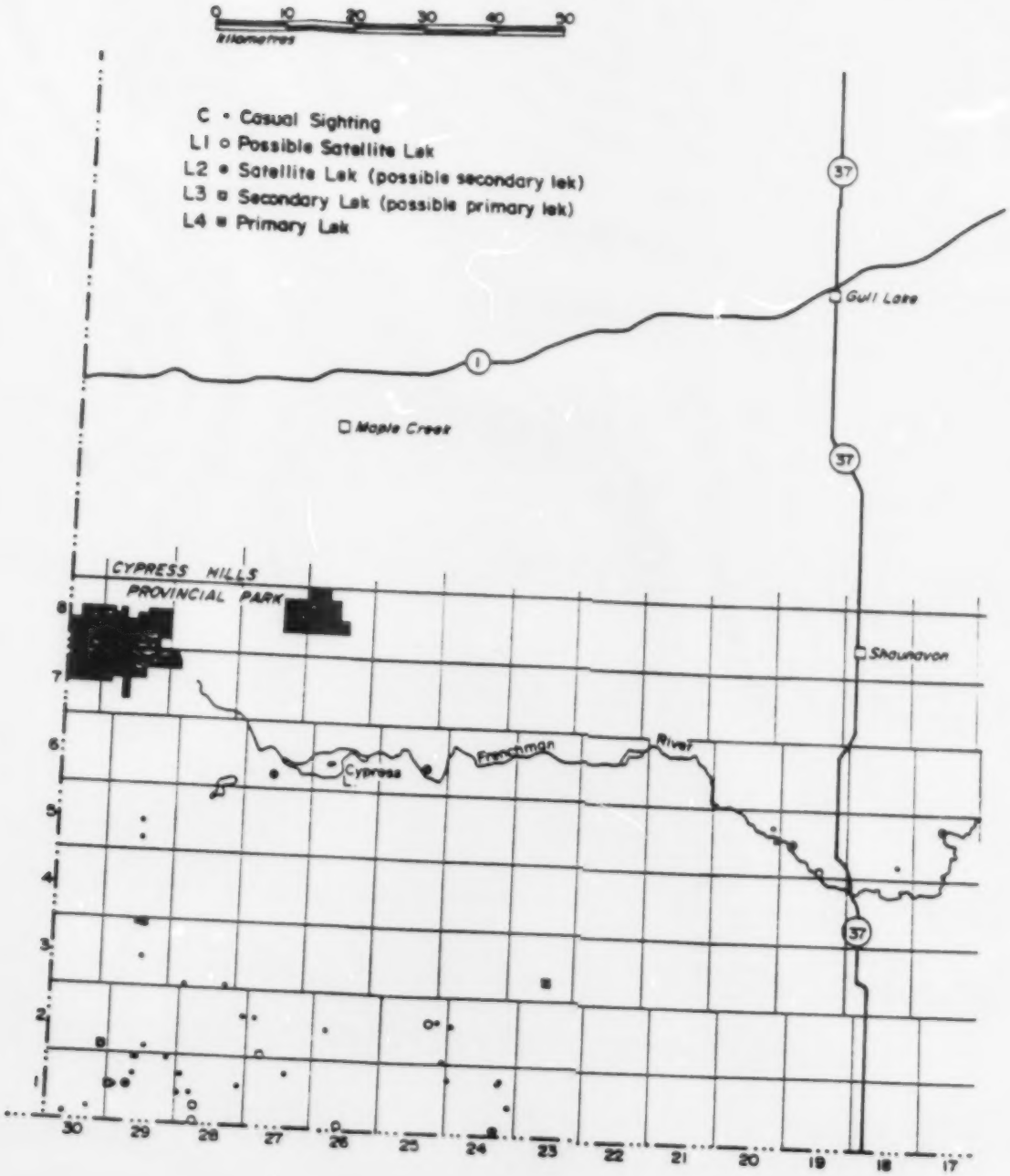
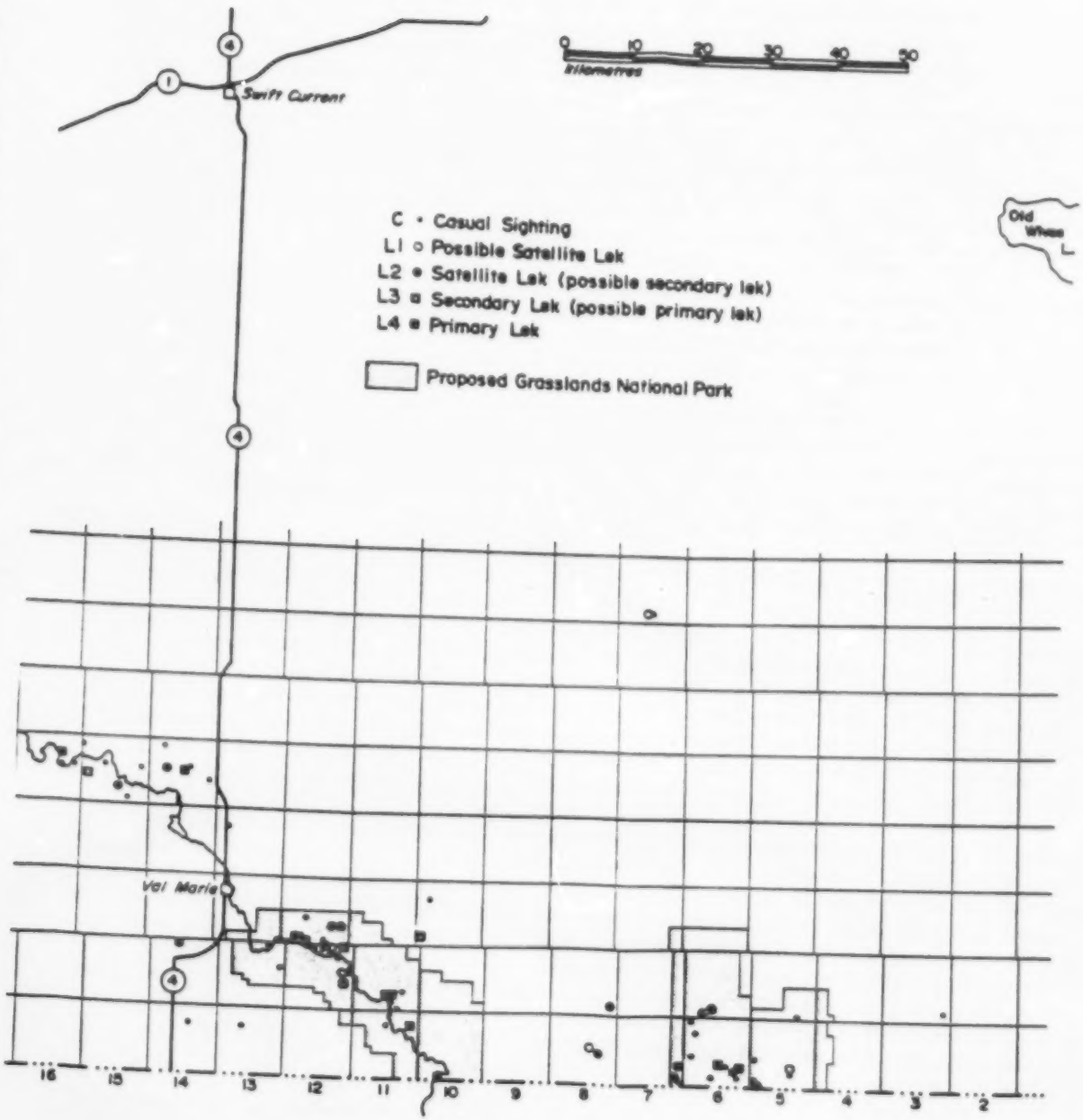


Figure 3b. Sage grouse leks and sightings in southwest Saskatchewan as of June, 1988 (continued).


Swift Current
Val Marie
0 10 20 30 40 50
Kilometres
C • Casual Sighting
L1 ○ Possible Satellite Lek
L2 • Satellite Lek (possible secondary lek)
L3 ▫ Secondary Lek (possible primary lek)
L4 ■ Primary Lek
Proposed Grasslands National Park
Old Wives L
16 15 14 13 12 11 10 9 8 7 6 5 4 3 2

# 4.0 Restoration Potential and Impediments

## 4.1 Species-Related Efforts

Limited information is available on species-related techniques for restoring, or mitigating detrimental effects upon, Sage Grouse populations. There are suggestions in the literature that both the lek and the grouse themselves can be moved to new locations. Johnsgard (1973) reported Sage Grouse transplantation (re-establishment) efforts underway in New Mexico and British Columbia. These efforts were apparently only successful in the former location and achieved through periodic releases of birds from Nevada (Donoho and Roberson, 1985). Although methodological details for transplanting were not obtained, it is known that it is relatively simple to capture Sage Grouse with mist nets, cannon nets or drive traps in the vicinity of leks (Browers and Connelly, 1986). However, capture and transport mortality, together with the ability of a species that normally shows lek-area habitat fidelity to adapt to new areas, would be obvious impediments to transplant success.

Eng *et al* (1979) obtained some success in moving an active lek over a distance of approximately 3.2 km. This was carried out as a strip mining-related mitigation measure and termed a "directed shift" of the lek. The experiment involved determining the seasonal habitat areas used by the grouse from the lek scheduled for destruction. A new lek site was created by late winter sagebrush and snow removal (on 4 ha) at a location between the main wintering habitat and the doomed lek site. Sage Grouse were then "lured" to the new site by use of silhouette decoys and the playing of pre-recorded sounds of strutting males. The method was used in two consecutive springs and resulted in a peak attendance of 18 females and 16 males in the second year. While this experiment appears to have worked in shifting the lek, subsequent monitoring showed a decline in use of the new site in later years. This is thought to have occurred because of the proximity of mining-related noise (Eng, pers. comm.).

## 4.2 Habitat-Related Efforts

In order to understand how habitat management can contribute to Sage Grouse restoration it is necessary to consider that, while sagebrush is a critical component, it is not the sole factor of importance. In particular, overall range condition, as it affects the availability of succulent forbs and visual cover, is crucial during nesting and brood rearing. Sagebrush elimination generally occurs through non-agricultural activities (e.g. road, industrial or urban development) or agricultural land use (e.g. range management or cultivation). In the case of the latter, methods have included ploughing, chaining, soiling, rotobeating, burning and herbicide spraying.

The impact of sagebrush reduction or eradication on Sage Grouse populations is usually negative, but can vary significantly. Wallestad (1975), reporting on several studies, cites percent population declines, following respective percent of sagebrush area reductions, of 0% after 11%, 50% after 24%, 63% after 31% and 100% after 49%. Swenson *et al* (1987) reported a 73% drop in the number of strutting males in an area where the proportion of ploughed wintering habitat increased from 10% to 30%. Studies such as these indicate both that the severity of impact depends upon the proportion of locally-available sagebrush habitat eliminated, and that there can be relatively low thresholds of habitat destruction above which detriment is highly significant. Conversely, Connelly *et al* (1981) concluded that the creation of small openings in or near extensive sagebrush stands was a possible method of stimulating establishment of new leks.

Range conditions are normally a function of the grazing pressure and management regime. Overgrazed range provides poorer concealment and feeding opportunities for Sage Grouse. Autenreith *et al* (1982). Meadows and riparian areas, important sources of forbs during brood rearing, are often especially hard

hit by livestock overgrazing and trampling. The effects are exacerbated when such areas are occupied by livestock during the nesting and early brood rearing period. Detrimental effects of physical disturbance of nesting grouse are also reported when livestock drives or grazing rotations result in the early summer presence of cattle in nesting habitats (Autenreith *et al*, 1982).

The implications of the above are clear in terms of the potential for, and impediments to, restoration and management of Sage Grouse. Opportunities to maintain or increase populations are severely restricted or absent where habitat quantity and quality cannot be assured or increased. These depend on land tenure and the prevailing management philosophy. Techniques are available for enhancing habitat value for Sage Grouse. Examples include: fencing-out and deferred stocking of meadows and riparian areas; reduction of stocking rates; alteration of grazing regime; range rejuvenation through reseeding and prescribed burning (in patches); and, water development to create meadows. The methods are of greatest value for improving nesting and brood rearing success. As such, they will only be a positive benefit to Sage Grouse in conjunction with adequate availability of disturbance-free lek sites, sufficient sagebrush stands for wintering, and an absence of excessive unnatural mortality factors. Finally, it must be recognized that considerable annual population fluctuations (e.g. due to climate variability) are normal for this species and may periodically frustrate management efforts.

# Section II -
# Sage Grouse Recovery and Management Plan

## 5.0 Purpose and Rationale

The Wildlife Branch of Saskatchewan Natural Resources (DNR) is mandated by The Wildlife Act to manage terrestrial vertebrate fauna. This includes both game and non-game species. Sage Grouse have not been hunted in Saskatchewan for decades primarily because they were considered to be scarce and there was no detailed information on their actual status to prove otherwise (Autenreith *et al.* 1982; Hart and Stewart, 1981). More recently, there has been increased emphasis on management of non-game wildlife; preservation and enhancement of rare, threatened and endangered species has become a growing priority for the Saskatchewan Wildlife Branch (Sherratt, pers. comm.). This reflects a broad public recognition, not only of the nonconsumptive recreational value of such species, but also of their own intrinsic value and basic ecological importance.

Sage Grouse in Saskatchewan were considered Potentially Threatened (SPRR, 1984), and in 1987 were classed as Threatened (SPRR 1987). The latter status means that Sage Grouse may become Endangered (in danger of extirpation) if there is no mitigation of the factors which make it vulnerable. It was on the basis of a Threatened status for Sage Grouse that certain Crown lands in the southwest area of the province were included under The Critical Wildlife Habitat Protection Act (CWHPA) in a 1988 amendment (Weins, pers. comm.). Further, the Prairie Conservation Action Plan (WWF, 1989) identifies Sage Grouse as one of numerous species in jeopardy requiring, at minimum, closer examination and a formal status report.

The purpose of a recovery and management plan for Sage Grouse is to ensure the provincial Sage Grouse population is maintained, or if possible increased, to fluctuate around a long term mean level that ensures survival of the species in Saskatchewan. Beyond the species' intrinsic right to exist throughout its natural range, and its role in the ecology of sagebrush steppe, the protection of Sage Grouse will also benefit humans through protection of natural heritage and genetic diversity, as an indicator of ecosystem integrity and rangeland condition, and provision of interpretive, educational and recreational opportunities. Whether the latter could extend to sport hunting is discussed in section 6.1 to follow.

## 6.0 Management Options and Constraints

A species management plan should include five basic strategies including:

1) protecting the species itself;
2) securing adequate habitat (of suitable quality);
3) direct re-establishment (when extirpated);
4) public education and co-operation;
5) population monitoring.

These strategies provide a framework for determination of options and constraints, goals and objectives, and implementation.

## 6.1 Species Protection

Sage Grouse now receive legal protection under The Wildlife Act. This pertains to capture, killing and possession, but does not necessarily cover disturbance or harassment. The question of whether they should continue to receive year-round protection, or whether a hunting season should be allowed, is a basic management consideration. Saskatchewan sportsmen have in the past requested an evaluation of the feasibility of hunting this species (Donoho and Roberson, 1985). The present situation in this province contrasts with neighbouring jurisdictions. The hunting of Sage Grouse in Montana is not surprising, however, the hunted populations in Alberta and North Dakota are as small or smaller than Saskatchewan's. It is therefore necessary to examine the parameters of Sage Grouse hunting as a potential component of species management.

In most areas where Sage Grouse are hunted, management is based on the premise that the relatively light pressure exerted by hunters is compensatory to the species' high natural mortality (Johnsgard, 1973; Wallestad, 1975). This is deemed to be the case if hunting results in a total kill of less that 20% of females and 30% or less of the adult (fall) population (Watts, pers. comm.). Yet, even in areas of relatively heavy hunting pressure (e.g. Colorado), the total hunter kill is estimated to be only around 10%.

Montana has a liberal season extending from late summer to early winter (section 3.0). Despite its length, close to half the Sage Grouse are taken opening day, and up to 80% are taken during the first week. Sage Grouse are available to all upland game bird licensees as part of their $6.00 (1988) fee. However, the species is apparently not highly sought after. Many Sage Grouse hunters are first-time or one-time participants in the taking of this bird; meat and trophy hunting are thought to occur in roughly equal proportions (Watts, pers. comm.). The effect on flavour of a diet that increasingly relies on sagebrush as fall progresses is considered to reduce recreational demand by those hunting for food.

Recent details are not known for Sage Grouse hunting in North Dakota. However, during the 1970's this State usually held a 3-7 day season in mid-September with a 1-bird (2 possession) limit. With a base population of about 1000 birds, estimated hunter kills were on the order of 100 - 300 (Donoho and Roberson, 1985).

The Alberta hunt for Sage Grouse used to be a 3 - 8 day season in late October, but in 1988 it was a 6-day opening at the end of November (Dube, pers. comm.) with a 2-bird season limit (section 3.0). The hunt is open to all game bird license holders ($6.00, 1988), but participation appears to be quite low. Total participation varied around 100 - 250 hunters during 1983-87. Hunter effort averaged about 1.4 days per person, while the success rate averaged close to 54%. Approximately three-quarters of the hunters involved are seeking a trophy for mounting; about 87% travelled at least 100 km, while over 50% travelled at least 200 km for an average 1 - 2 day hunt (Banasch, 1985).

The foregoing indicates that Alberta and North Dakota subscribe to the views, regarding hunting, of the Western States Sage Grouse Committee. The committee feels that "under present management programs Sage Grouse in most occupied ranges are probably at the population level the existing habitat can support during the critical period of the year." As well, "data are not available to suggest that closed or restrictive hunting seasons will materially affect overall population levels on their primary range." (Autenreith *et al*, 1982, page 17). However, the notion that hunting mortality is truly compensatory, rather than additive, has never been studied in detail in fringe regions of the species' range where population densities are lower and environmental stresses are greater. Hunters cannot be expected to effectively avoid taking the most robust birds from a flushed flock, those most capable of surviving winter to become successful breeders.

Whether or not the Saskatchewan Sage Grouse population is to be hunted is as much a socio-economic question as a biological one. The available supply of grouse remains to be quantified in greater detail. If the aforementioned estimate of 2000 birds represented a long term average provincial spring population, one could project a theoretical fall population on the order of 5000 (section 3.0) consisting of about 800 adult males, 1200 adult females and 3000 juveniles. Assuming all other factors to be stable (e.g. habitat quantity and quality), a sport hunting limit of, say, 200 birds would thus represent only a 4% kill from a population having at least 60% natural annual mortality. Borrowing the Alberta values for hunter effort and success rate, an average annual quota of 200 birds could furnish 370 hunters with close to 520 person-days recreation.

In Alberta, where the human population is roughly double Saskatchewan's, and where Sage Grouse hunting has been open to all upland game bird hunters at no extra license cost, recent participation has not been anywhere near 370 persons despite the available opportunity. It is expected that in Saskatchewan the long term recreational demand would also be quite low, consisting primarily of one-time trophy hunters, but could possibly include more intensive initial pressure in response to the novelty. Average participation at a proportionally-similar rate would place it in the range of 50-125 hunters per year. Furthermore, to generate any significant additional direct revenues to the Province, the Sage Grouse licenses would have to be sold separately, and could even then only generate a maximum of a few thousand dollars. It is doubtful this would offset required management costs such as population monitoring, administration and operating check stations.

Notwithstanding the perspective of recreational demand, allowing Sage Grouse to be hunted would be difficult to justify now that they have been listed in the Prairie Conservation Action Plan (WWF, 1988) as a species in jeopardy. The Saskatchewan government has endorsed that Action Plan. In it, Goal 6 is designed to ensure no additional species become Threatened, Endangered or Extirpated; a goal to be met primarily by way of habitat protection. The principal recent actions by the Wildlife Branch in this regard have been to consider the presence of Sage Grouse leks, both, when selecting additional land for designation under The Critical Wildlife Habitat Protection Act (CWHPA), as well as during review of various development proposals. It is therefore difficult to imagine that there would be much demand, or public support, for a plan to open the population of a Threatened species to hunting, especially for trophy purposes. This is especially true with the risk that in an opening year hunter effort may be concentrated at 2 or 3 well known leks and have significant effects on these populations.

The Grassland National Park, which will eventually include a significant portion of the Sage Grouse range, further restricts opportunities for hunting.

## 6.2 Habitat Securement

Ensuring the availability and integrity of suitable habitat is paramount to the effective management of any species. The extent and condition of Sage Grouse habitat in Saskatchewan has yet to be evaluated in detail. The Terrestrial Wildlife Habitat Inventory (TWHI), a regional reconnaissance by 1:250,000 topographic map sheet, designated 1970 $km^2$ of remaining native habitat on the Cypress (72-F) and Wood Mountain (72-G) sheets as critical habitat for Sage Grouse (Hart and Stewart, 1981; Barber *et al*, 1976). This was done on the basis of the concentration of sagebrush stands within the Drainage, Eroded, Meltwater Channel and Solonetzic Soil land systems recognized by the TWHI. Overall, 16% of these two map sheets was considered critical habitat (for various species), with approximately 63% of it being provincial Crown land.

Another perspective on habitat tenure can be derived from Table 2 (section 3.0). The type of land tenure is given for confirmed lek locations, along with the proportion of adjoining Crown land, and an indication of whether the land is designated under the CWHPA or is within the proposed Grasslands National Park. Table 3 summarizes this information by lek type. Only one of 48 leks is situated on private land. The remainder, including all 17 primary and secondary leks, are in Community Pastures or on provincial Crown land leased to individuals. Almost half the leks are on lands proposed for eventual inclusion in Grasslands National Park. A further 8 leks are presently protected by the CWHPA.

**Table 3. Land tenure and protection status by lek type.***

| LAND TENURE | L1 | L2 | L3 | L4 | Total |
|---|---|---|---|---|---|
| Private | - | 1 | - | - | 1 |
| Crown: Leased | 5 | 15 | 8 | 4 | 32 |
| Crown: Community Pasture | 5 | 5 | 3 | 2 | 15 |
| Subtotals | 10 | 21 | 11 | 6 | 48 |
| % Adjacent Crown Land** | 81 | 82 | 90 | 95 | |
| PROTECTION STATUS | | | | | |
| Designated CWHPA | 2 | 3 | 2 | 1 | 8 |
| Grassland Nat. Park | 3 | 10 | 6 | 3 | 22 |
| Subtotals | 5 | 13 | 8 | 4 | 30 |

* Includes all known L1 and known or suspected L2, L3 and L4 lek types as defined in Figure 2 and listed in Table 2.

** Based on tenure of land within 1.5 km (1 mile) radius of perimeter of quarter section on which lek is situated.

Apart from the paucity of information on habitat quality, it seems that the potential to protect at least leks and their immediate surroundings may be moderately high. Outright purchases of, or easements on, private land are apparently not actions requiring immediate priority. The 22 leks which could become situated in the National Park should, ultimately, provide reasonably secure habitat. However, the park's land acquisition phase may last several decades, making interim management and protection necessary. For the remainder, a very minimum effort would involve extending CWHPA designation to at least 18 more quarter sections on which leks occur. A more realistic approach would be to secure all habitat within 3 km of all primary leks, together with all areas found to be key brood rearing and winter range, and to ensure that any needed habitat enhancement is implemented.

## 6.3 Re-establishment

Based on the information obtained from the literature, it is unlikely that direct release efforts would prove worthwhile. Their purpose would be to attempt to expand the range of Sage Grouse within the province by establishing additional primary leks in outlying, climatically-marginal concentrations of sagebrush. On the other hand, the "directed shift" approach discussed in section 4.1 shows some small promise as a possible method for mitigating certain development-related impacts. Success would probably depend both on adequate lead time and the existence of ideally-juxtaposed elements, including proximity of suitable alternate habitat.

## 6.4 Public Education and Co-operation

Sage Grouse are a fascinating feature of the grassland ecosystem, but this is a species about which the general Saskatchewan public probably knows very little. This assumption is based on the fact that the species has a low population and a very low profile. The latter stems from several circumstances: a range situated in an area of low human population density; lack of a hunting season; comparatively small population and flock size; absence of notoriety, such as may be the case for cougar, rattlesnakes or large birds of prey; absence of significant competition with humans; and, a perceived lack of serious jeopardy, such as may be the case for whooping cranes, swift fox or even prairie dogs. The resulting relative anonymity is somewhat beneficial in the sense that most detrimental human impacts are probably more inadvertant than deliberate. Conversely, it may initially be a minor constraint in as much as a high positive profile would likely make it easier to implement recovery and management efforts.

Opportunities for public input into Sage Grouse management are various; most involvement would have to come from landowners, lessees and municipal ratepayers in affected areas of the range, as well as from the membership of conservation and wildlife organizations. Direct participation is possible or necessary in population monitoring; surveys and research, as well as habitat enhancement and protection. Such activities would augment any initiatives and actions by relevant government agencies.

## 6.5 Population Monitoring

Neither ongoing management, nor possible additional recovery, can be assured without adequate knowledge of species' numbers, beginning with an extended baseline inventory. As suggested by the discussion in section 3.0, the status of the Sage Grouse population in Saskatchewan remains to be fully quantified. The present baseline does not contain a long, continuous record at any one lek and it is very likely more leks can be found. Furthermore, it is necessary to recognize, both, that there are limitations in use of spring lek counts alone to quantify the population, and, that the 1987 and 1988 regional Saskatchewan surveys and lek counts may not provide optimum data due to their comparatively early timing.

Several investigators have focussed on spring lek count methodology (Jenni and Hartzler, 1978; Beck and Braun, 1980; Emmons and Braun, 1984). There is some consensus that lek counts can give highly variable data not necessarily always well correlated to the overall Sage Grouse population level. Factors such as male attendance variation, the appearance of temporary satellite leks when populations are high, significant inter-lek movements among closely-situated leks, and the effects of daily weather on activity levels are cited as contributors to variability in the data. Yet, lek counts remain a fundamental part of population monitoring in jurisdictions that allow Sage Grouse hunting, although brood surveys, hunter check stations and wing analyses are often used as data supplements (Autenreith *et al*, 1982). Timing is all-important in the spring lek count method; diurnal as well as seasonal. Only early morning counting is advised, as evening activity on the lek is reduced and more variable. Emmons and Braun (1984)

recommended each lek be counted four times, although 3 counts were considered acceptable (90% accurate) by Jenni and Hartzler (1978). The former authors suggested counts once, twice and once again, in the periods April 10 - 20, April 21 - 30 and May 1 - 10 (respectively) during an early spring in Colorado. Kerwin (1971) felt that the peak of breeding activity is slightly later in the (higher latitude) Alberta and Saskatchewan portions of the continental range, with peak male attendance around May 10 - 20 in 1971. Banasch (1985) indicates Alberta's biannual counts have usually been conducted during the first week of May to catch the assumed peak of strutting males on leks in that province.

The 1987 and 1988 Saskatchewan data by Harris and Weidl was collected between April 3 - 21 in both years. Although they felt their work may have been too late in the breeding season, it is also possible that the opposite may be true, even in spite of the relatively warm and early spring seasons in those years. The question can only be answered with the opportunity to do an ongoing annual count. However, all available evidence suggests leks here should also each be counted at least 3 times, including counts after April 21. When the consolidated record of Saskatchewan lek counts (i.e., Bergstrom, 1987; Harris and Weidl, 1987 and 1988; Hjertaas, 1988; and Kerwin, 1971) is sorted by date, the average number of males seen is 16.3 for dates on or before April 20 and 20.3 (about 25% greater) for dates on or after April 21. Both these values are below the 26-28 figures reported by Kerwin (1971) for counts that peaked later. Further corroborating evidence of the need for later counts is seen in Harris and Weidl (1988), where 9 leks were each visited 4 to 6 times between April 3 - 18. The mean number of males was 13.6 before April 10 and 23.4 (or 72% higher) on or after that date, strongly suggesting that still later counts could have yielded even higher numbers of males. Of course, the wide dispersion of leks over the range, plus the amount of available funding, will always affect the possible level of survey effort and counting frequencies.

## 6.6 Information Gaps

The present level of knowledge about Sage Grouse in Saskatchewan continues to place constraints on the formulation of an effective plan for the recovery and management of the species. The surveys facilitated to date provide an excellent starting point, but the complete distribution and actual status of leks needs to be more firmly established. A period of time is needed in which known leks can be regularly monitored during the optimum counting period. As importantly, brood rearing and wintering habitats should be mapped and qualitatively evaluated. These tasks are prerequisites to allow for more dependable estimation of the current and potential long term provincial Sage Grouse population. Since the species is also habitat-limited, the possibilities for long term success in maintaining or increasing its numbers cannot be confidently assessed until existing circumstances of habitat condition and land/resource use are identified.

# 7.0 GOALS, OBJECTIVES AND ACTIONS

## 7.1 Preface To The Recovery Section

The following recommendations are for a 10-year Preliminary Sage Grouse Recovery and Management Plan. They represent the current opinion of Wildlife Branch staff on the most important management actions to be taken for Sage Grouse. The plan is intended to ensure that all management efforts for Sage Grouse are directed to the most important areas. Nonetheless actual implementation of the plan is contingent on appropriations, priorities and other budgetary constraints.

Current knowledge of species abundance and distribution, as well as of amount and condition of habitat, necessitate an emphasis on data collection in the first 5 years. The plan should then be reviewed, updated and revised as needed. Sage Grouse should be deemed to be a Threatened species until a more comprehensive data base enables this status to be re-assessed.

## 7.2 Goals

7.2.1 To ensure that Sage Grouse remain an integral and viable part of the prairie ecosystem in that portion of the species' continental range extending into southwestern Saskatchewan.

7.2.2 To ensure the sage Grouse population in Saskatchewan is stable and self sustaining such that the species is no longer considered threatened in Saskatchewan.

The Sage Grouse should be removed from the threatened species list when the objectives have been met and are expected to be maintained for at least 10 years.

## 7.3 Objectives

7.3.1 Maintain Sage Grouse range in Saskatchewan as contiguous with that in Alberta and Montana, with the minimum extent and zones of concentration indicated in Figure 4.

7.3.2 Maintain a minimum of 25 active primary and secondary leks across the provincial range, together with sufficient brood rearing and wintering habitat to ensure the achievement of all the Goals and Objectives of this plan.

7.3.3 Maintain a provincial spring population averaging at least 500 male Sage Grouse on leks.

### 7.4 Actions

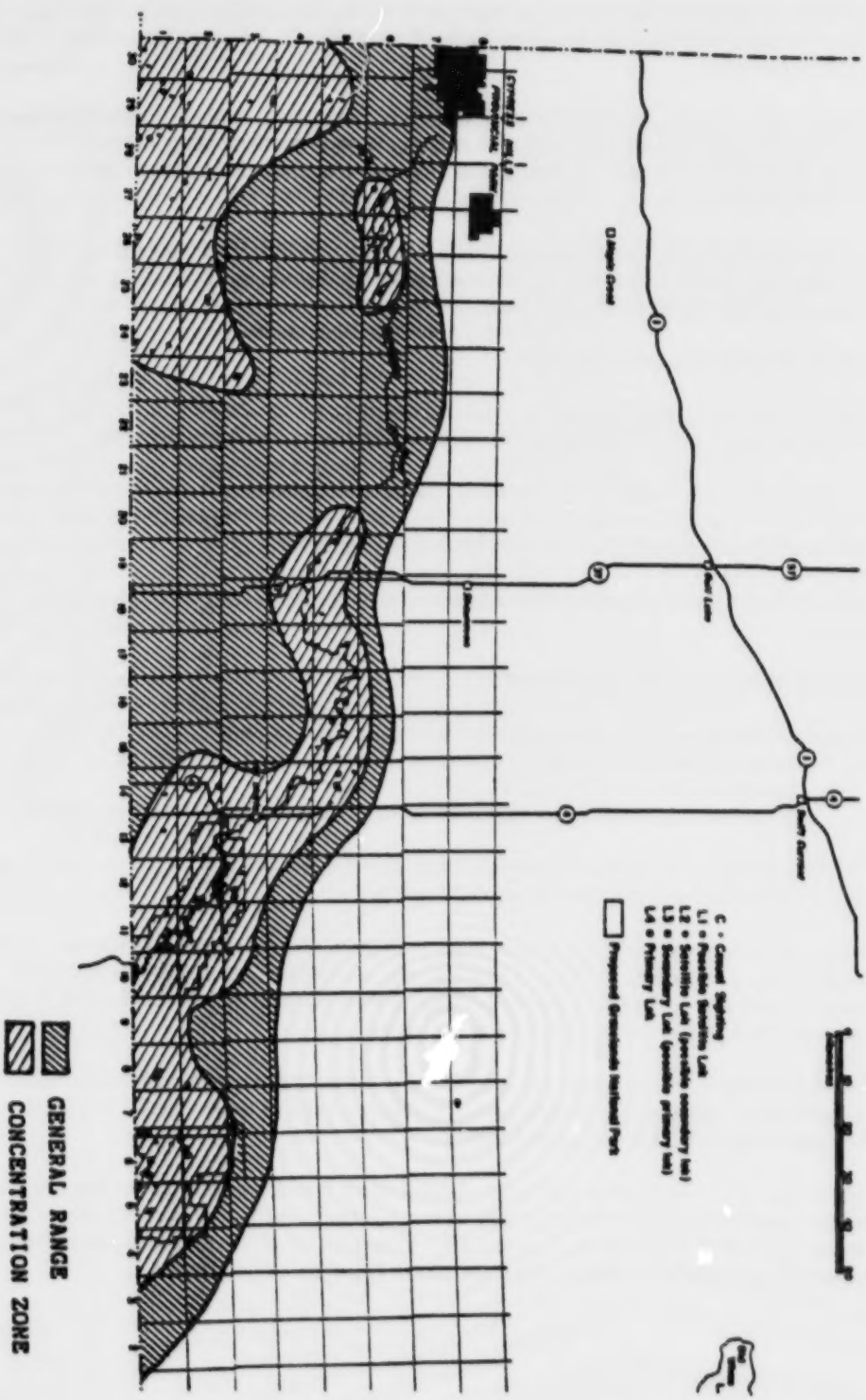
#### 7.4.1 Population Monitoring

7.4.1.1 Conduct spring lek counts to classify and confirm activity of all known or suspected primary and secondary leks. Survey methodology should follow that recommended by Autenreith *et al* (1982), ideally including one morning count on each lek in each of the periods: April 10-20; 21-30; and, May 1-10. For lek classification the highest count should be used. If only 1 count is available it should be used.

7.4.1.2 Conduct annual spring lek counts on selected leks to monitor changes in the population in relation to the goal of 500 males on leks. Survey methodology should follow that recommended by Autenreith *et al* (1982), ideally including one morning count on each lek in each of the periods: April 10-20; 21-30; and, May 1-10.

7.4.1.3 Determine the extent to which Sage Grouse near the U.S. border seasonally move in/out of Saskatchewan.

Figure 4. Proposed extent and zones of concentration for protection of Sage Grouse range.



## 7.4.2 Species Protection

7.4.2.1 Maintain Sage Grouse as a protected nongame species under The Wildlife Act for at least five years. Protection should be provided by the National Parks Act on lands under the jurisdiction of Parks Canada.

7.4.2.2 Disallow sport hunting of Sage Grouse unless and until: the species' Threatened status can be confidently discontinued; the population is considered to be fluctuating within the carrying capacity of the habitat; and, a clear and strong demand exists for a manageable, economically viable hunting season.

7.4.2.3 Use the Wildlife Refuge provisions of the Saskatchewan Wildlife Act where it is deemed necessary to ensure Sage Grouse are protected from disturbance during the peak breeding period on primary and secondary leks.

7.4.3 **Habitat Identification and Evaluation**

7.4.3.1 Conduct and complete a staged, 5 - year survey program to ensure that all lek complexes and associated principal brood rearing and wintering habitats have been identified.

7.4.3.2 In conjunction with Action 7.4.3.1 (above), conduct reconnaissance surveys to map, and evaluate the quality and integrity of, all key habitat areas including major wintering areas and the habitat within a 5 km radius of primary and secondary leks.

7.4.3.3 Research the impact of grazing and other land uses on the productivity of habitats for Sage Grouse.

7.4.4 **Habitat Protection and Enhancement**

7.4.4.1 Extend Critical Wildlife Habitat Protection Act designation to Sage Grouse habitat on:

- all provincial Crown lands at and within 5 km radius of active primary leks and 3 km radius of confirmed secondary leks;
- all provincial Crown lands identified as key brood rearing or wintering habitat.

7.4.4.2 Protect, by means of long term easement agreements, any primary leks and brood rearing or wintering habitat subsequently found on private land.

7.4.4.3 Ensure there are reliable mechanisms (e.g., the Environmental Impact Assessment process) for development proponents, whether municipalities, businesses, government agencies or farmers/ranchers, to be made aware of whether their planned activities will affect Sage Grouse and how impacts are to be prevented or mitigated.

7.4.4.4 Provide the relevant land users with information and technical assistance on methods to better integrate their activities with maintenance or enhancement of Sage Grouse habitat (e.g., grazing rotations, livestock drive routes and timing).

7.4.4.5 Ensure, for soil conservation and range management benefits as well as for Sage Grouse, that habitat enhancements are implemented where needed to restore or improve crucial brood rearing and wintering areas (e.g., restoration of sagebrush winter habitat areas on which marginally-successful or failed cultivation efforts could be abandoned).

### 7.4.5 Interagency Co-operation

**7.4.5.1** Establish a mechanism for ongoing information sharing between Saskatchewan, Montana and Alberta (e.g., participation in the biannual meetings of the Western States Sage Grouse Committee).

**7.4.5.2** Establish a mechanism for ongoing co-operation between Saskatchewan's Wildlife Branch and Environment Canada (i.e. Parks Canada and/or Canadian Wildlife Service) concerning interim and long term protection, management and enhancement of Sage Grouse and their habitat within the proposed boundaries of Grasslands National Park.

**7.4.5.3** Ensure that Saskatchewan Environment and Public Safety, Saskatchewan Agriculture, Saskatchewan Rural Development and the federal P.F.R.A. are apprized of Sage Grouse management efforts, and progress in implementation of this plan, in order to make it possible for them to assist in accomplishing its Goals and Objectives.

### 7.4.6 Public Education and Co-operation

**7.4.6.1** Prepare and make available for circulation/distribution, printed material (e.g., pamphlet) and audio-visuals (e.g., slide/tape or short video programs) on Sage Grouse ecology and management.

**7.4.6.2** Seek the assistance of the Saskatchewan Natural History Society and Saskatchewan Wildlife Federation in locating local area residents willing to take part in annual spring counts of leks near their residence, in searching of additional leks, or in periodic monitoring of identified brood rearing and wintering habitats.

**7.4.6.3** Where appropriate, and to the extent possible, develop jointly-funded projects or programs with conservation/wildlife organizations to facilitate implementation of this plan.

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